Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- Miscellaneous Books
Notebook, N-17-01-06

This notebook was used by Absalom M. Kennedy during January-February 1917. The entries consist primarily of daily logs of experimental recording activities at the Columbia Street Studio using various kinds of music and recorders. Included are comments on the loudness and quality of the sound. The determination of quality was based partly on "tone tests" in which a performer's recordings were compared to a live performance by the same individual. The notes indicate that Edison oversaw the work and periodically listened to the experimental recordings and that E. Rowland Dawson and Clarence B. Hayes assisted in some of the experiments. At the beginning of the book are two pages by an unidentified author noting the numbers of blanks on hand. Inserted into the book is a three-page handwritten list by Kennedy with entries numbered 1-27, along with a related typewritten list. The front cover is labeled "Notes, Columbia St. Studio from Jan. 6, 1917." The pages are unnumbered. Approximately 40 pages have been used.

Blanks

Nov. 24th
On board 19 B.T. Mate Chicago.

C.J

Nov 24th
In Note 263 Trial Blanks
including experiments held for
Mr Edison

1/6/17.

Trials of #0 head expanding against #3 " contracting taper.
Showed conclusively that the expanding head was louder, fuller & richer sound.
With disc machine at 6' did not make as much difference as at 4'

Dawson showed me Beethoven's Funeral March made here and in #4 Bldg. Former is better in quality & naturalness than former and in the musical arrangement - as the latter sounds staccato beside it not in keeping with a funeral march at all.

Made record of all recorders for Mr. E.

Must get machine ready for him to hear records on.

1/8/17

Violin

① 100		100	100
② 10 L	Sharper	105	110
① RB-Head X		100	100
② RB-Head Y	sharper	110	110

The above tests are to show the influence of expanding taper head. In both cases they show

① Superior Loudness
② Less tendency to bleat
③ Greater Fullness
④ Greater sharpness
⑤ Greater "stand out of horn".

Oboe

① Ring B-Head Y	110	90
Ring B-Head X	100	100
Ring D-Head X	100	100
Ring D-Head Y	100	105

The above test does not hold out on voice as with violin.

RA - Head X	100	100
RA - Head Y	90	90

This entirely reverses tests made the first time that the expanding head made the records louder & sharper. In this case the contracting head showed louder & fuller than the expanding.

Quartette at 5'

① Ring B Head X	100	100
② Ring B Head Y	110	90
① Ring D Head X	100	100
② Ring D Head Y	105	110

Above results contrary. must work out to prove up.

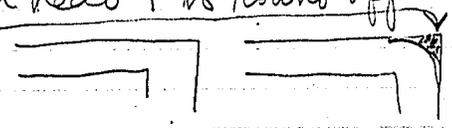
1/9/16

	100	100	100
	3	120	100
	7	90	110
	B	90	120
*	A	85	100

Ring 3 shows up louder than 100 but similar in quality – sharp.
Ring 7 is not as loud but good full quality.
Ring B shows less surface than any not quite as loud as 100 but excellent quality.
Ring A – not as loud as any & not extra good quality. Well tear up.

Ring A	Head X	100	100
Ring X	" Y	100	95
Ring C	" X	100	100
Ring C	" Y	90	95

Poured wax in Head Y to round off back edge



Violin

Ring A Head X	100	100
Ring A Head Y	110	110

Voice

Ring A Head X	100	100
Ring A Head Y	115	100

It is evident ~~that~~ filling in with wax improves these expanding taper recorders.

Voice

Ring D Head X	100	100
Ring D Head Y	125	125

Shows up superiority of this head even though Dawson was not singing as well in second case as in first.

Violin

Above ~~test~~ made showed head X louder & on tone ~~test~~ trifle more natural.

Phonograph

Ring D Head X	100	100
Ring D Head Y	115	110

Louder & stands out better.

Voice Dawson

Ring 3 Head 0	100	100
Ring 3 Head 3	120	120

1/10/17

100	sharp - loud - stands out	100	100
E	Does not stand out as well - fuller	100	120
* A	Full of noises - rattles	90	—
Ring E - Head X	punched.	100	100
Ring E - Head Y	slight rattle more ones	100	110

Tried tone test on above. Head Y shows very much more natural.

Contrasting Recorder # 130 inch

No B			
130	Sharper - stands out more	100	100
B	smoother		

Violin & Piano

130	sharp -	100	100
Ring B - Head X		85	110
Ring B - Head Y		100	125

Volume by Listening
Quality by Tone test

Voice – Dawson

Ring E-Head X	100	100
Ring E-Head Y	120	125

Volume compared by listening
Quality by tone test.

1/11/17.

Tried out new heads A & E. A was reluctant same as A of yesterday except that a heavy coating of shellac was put over the disc and around edges so as to firmly bind this disc to the diaphragm.

E was disassembled by taking off arm & foot, shellacking disc as above and replacing arm & foot.

This seemed to improve both recording as following test shows both rate high which they did not on previous day.

Comparative trials showed as follows.

#100	100	100
a-x	90	110
a-y	110	120
E-x	95	110
E-y	100	120

Then made tests of all reeds with violin to determine one best for comparative recording
Volume test regular
Quality ~~test~~ by "tone test".

	#100		100	100
Best 4	A	sharper & stands out more	115	120
	B		110	115
	C	even	115	110
	D	little further back than C	110	120
	E	full	120	115
	F	sharper	115	110
Best 3	1		110	110
	2		115	120
	3		120	120
	4		110	115
	5		115	110
	7		105	115
	8		105	120

1/12/17.

B-X	100	100
B-Y	115	125
B-Z	125	120

The Y head is much sharper than X or Z. Z is much louder & is the most natural.

In making these records the room was so cold it was necessary to heat the machine. This was over-done and the temperature of the wax was about 105°.

Compared B-Y made yesterday with wax about 65° and to-day about 105°. Found ~~that~~ today records were louder & fuller.

Made test with paper diaphragm between nozzle and horn.

Records both on violin and on voice show that the paper not only thins & sharpens tone but

promotes beats on a resonant note B^b in this case.

Voice – Dawson –

DX		100	100
DY	louder - sharper - more open	115	125
DZ	clear pure - true but fuller than Y	115	130

Tone ~~testing~~ shows
X fuller than Dawson
Y brighter or sharper than Dawson
Z most closely approximates quality.

With Phonograph

DX	100	100
DY	110	120
DZ	115	120

Played the above record on Standard machine in music room. Results less marked to me than the above.

Hayes gave DX best in 2 instances
Taylor " DX best in one & DZ in another

Will try other reproducers on

① - 100-100 ② · 120-110 ③ · 150-~~80~~ 100

machine in Studio and attempt to determine where trouble lies.

1/15/17.

Test of new ~~Head~~ Ring #1 against #100

#100	100	100
Ring 1 - Head Z	60	110

Same to see whether head or recording makes difference

#100	100	100
Ring 1 - Head H	50	110
Ring 1 - Head Z	60	120

Ring 3 - Head H	100	100
Ring 3 - Head Z	110	100

Too cold for recording at 4:15 P.M. Temperature 58°

①	100	100	Z
②	90	120	X
③	90	90	4
④	110	100	100

		Tone Test	
100	100-100	①	85 X
~~Δ4~~	90-90	②	90 100
ΔX	90-120	③	95 Z
ΔZ	115-110		

① - 100-100 sharp. 2
② - 110-120 full rich. 100
③ - 115-115 not as fierce stands out bette 0
④ - 115-115 about same. 4

3-4 - full muddy goes to pieces. 100-100
3-0 - louder cleaner & richer 110-115
3-Z - further back - hasto-clean 90-110
100 - bifle back does not hadasmu 100-105

1/10/17

I tried the following recorders and had them play in unknown order and rated as follows:

①	~~ΔZ~~	100	100
	~~ΔX~~	90	120
	~~Δ4~~	90	90
	100	110	100

Violin

Again Rating only on Quality by tone test — 100 being perfect violin quality.

~~ΔX~~	85
100	90
~~ΔZ~~	95

-4

With Dance (Dawson) not knowing which is which.

3-4	100	100
3-0	110	115
3-Z	90	110
100	100	105

		Dawson	
1	100-100	BZ	92
2	90-110	○ BX	88
3	95-110	○ BX	90
4	85-105	① BZ	96

Test not knowing violin -

		Time Trial
BZ	100-100	92
BX	90-110	88
BX	95-110	90
BZ	85-105	96

Comparing Prevoland make on long bend RDNZ with large horn R113.

Tested with violin, B-Z against 2-Z (Hayes last head). Found B-Z not only better quality but louder, particularly on the higher notes.

This would seem to show that we have improved the recording and are ready for heavier trials,

① -100- full
*② -90 stands out better noisy
③ -120- sharper-

Cut out A

1/17/17

Take up personal equation in playing.

		Tone	Test
① - BZ		100	100
*② - AZ	surface	95	100
③ - 1Z		100	105

These hangs were made (A & 1) with .0005" aluminum in place of .001" as B which is best on violin. Seems that the thinner does not make materially louder

Voice		Tone	Test	Vol
3Z		80	100	100
* AZ	Rather louder Too much surface		110	120
1Z	" " Full. fine	95	115	125

This reverses somewhat above On voice the thin aluminum is much nearer the true quality of voice.

Test on Miss Buchlinder

3 Z	100	100
1 Z Fuller.	120	?

? Boosted up better on tone test
This record is much fuller than #3.

Further tests both on violin & voice showed pung 1 to be loud & full.

①	100				
②	120				

1/18/17

Test New Recorder - Violin

		Tone Test
8 Z	100	90
5 Z	83	96

Same Voice

		Tone Test
3 Z	100	96
5 Z	80	92

① 100 — 3 Z — 100 — 96

② 125 — 5 Z — 80 — 92

~~[illegible]~~

Made record of Kuiawiak on violin with 5 Z. Have never been able to get this without blast before. Made record without even moving back of this showing no blasts. This recorder is somewhat sharp but holds better than any we have. This was even in spite of bring the piano closer.

Mr. Lowrey brought Miss Beatty out. Made records of them with songs 3-5-D. Do the best

on Lowrey's voice - 3 is a trifle sharp - but makes it stand out. D is richer, fuller & holds better.

Miss Beatty has a "spotted" - mezzo soprano voice which changes quality & becomes fuller especially on her high & powerful tones. For this reason 5 which is sharp & holds was best on her but did not even hold perfectly.

Am encouraged with results to ~~to~~ day.

It is also evident ~~that~~ head I makes records sharper & louder & stand out more than X or the old 3 we used before.

It is therefore possible to note only lighten & makes sharper by different springs but also by different heads.

① –

①	sharp	100	100
②	louder & sharper & cleaner	105	110
①		100	100
②		195	95

3 P.M.

1/18/17

Dawson points out that recorder #5 of yesterday has probably loosened up & changed.
At first it was very weak and sharp. Then on violin record of Kwaniak – Louder & Reed. On Miss Beatty blasted somewhat.
Will try it out to day and see what it does.

		Vol	Qual
	~~Violin~~		
100		100	90
5 X	sharper	90	90
5 Z		90	85
	~~Violin~~		
5 Z		100	100
5 X	~~Voice – 4 ft~~	105	110
5 Z		100	
3 Z		120	
5 X		120	
3 X		125	

Test showed that #5 recorder had not become noticably looser than since first made.
Is firm and holds fine

CHJ

– Used all sorts of bunshing.
The resultant records ~~are~~ when made close are loud – and stand out as no previous records ever have –

1/22/17

Oeolin

100		100	100
5X		90	110
8X	- fuller -	85	115
AX	-	80	105
EX	- sharper & louder ~~standout~~	85	115
FX	- loud full - Some surface	110	115
1X	- loud full - surface - blasts	110	110

Tone test same

1X	fuller Than viola	85
FX	" " "	95
EX	sharper " "	90
AX	close	95
8X	back in horn fuller	85
5X	woody.	90
100	woody	90

Voice Dawson - 4'

100	triple back.	100	100
1X	Blasts surface especially on piano	125	115
FX	back " " " "	125	115
5X	- back Does everything	85	110
✓ 8X	- Soft sweet quality	90	120
X AX	- soft quality. back.	85	115
✓ EX	- soft clean quality	90	120
FX	- loud blasty on piano	120	115

[65]

Dawson Voice - close up.

5 X	sharp.	100	100
8 X	fine surface fuller - better further back	95	110
✓E X	good - stands out natural	105	115

Further tests on voice and on violin playing Kreisler showed the superiority of recorder E. This is almost if not quite as loud (close up) as #5 of last week and has much better quality - is clean clear & fairly full. Makes best records both of voice and of violin.

Tomorrow will test the pressed series (#1 and F) from distance for sensitiveness & and use head Z in place of X with them.

①	100	100
②	95	110
③	105	110

Tone Test

A	85
E	95
100	85

1/23/17

Tested nard recorder A as follows
Violin

100		100 - 100
EX		92 - 110
AX		95 - 100

Violin on Kuiawiak

100		100 - 100
AX	blasts fuller	110 - 90
EX	clear - hoots	95 - 120

Comparison ax & asf

ax -	blasts truffle	100 - 100
asf -	sharper cleaner & hoots better	110 - 110

Same on Voice, at H'

asf -		100 - 100
ax -	better - cleaner —	105 - 110

Then tightened head A.
On violin, hoots better because sharper & cleaner & holds.
On voice, very much better, cleaner & better definition.

Violin & Voice

* AX tightened 100 - 100
EX 110 - 120

AX does not equal EX either on violin or voice.

Made tests of recorder E on Miss Buchlander. Find that it is natural & hoots.

Made comparative tests of strings E & F both on voice & violin. On voice F sounded flutey and was not so clear. On violin got curious effect. E brings out the violin & makes it clear, clean, prominent and natural and hoots the piano back. F makes the violin no louder but brings up the piano, making it much lovelier than before.

I believe that E quite shows the effect of distance much more than F or similar free recorders.

1/24/07.

Tested out procedure as follows:

Violin

100	100	100
EX	95	105
AX	90	105
S	90	120

Tone Test Violin

100.	85
EX	95
AX	90
S	92

Voice-Tension.

100	100	100
EX	90	120
AX	85	125
S	95	125

Tone Test

100	85
* EX	92
AX	90
* S	97

Subject at Victor machine in music room showed E better than S, S too full & back.

Comparison E and S with Kinamick - E is louder, sharper & stands out better. S [illegible] in luggage, [illegible] natural.

Comparison E & S on a piano of Miss Brookline's [illegible] E is louder, [illegible] sharper, stands out better [illegible] fuller, [illegible].

Thought perhaps that the sensitive pendulum would show better distance [illegible].

at 8'

E - 100 - F - 120 S - 110

at 4'

E - 100 F - 120 S - 113

at 1'

E - 100 F (blue) 125 S - 110.

1/25/17

Test of 5 recorder with small tube against large tube.

Voice

With the large tube the record is louder, cleaner & stands out better. Quite an improvement.

Violin

Same result — the record is louder, cleaner & stands out much better with the large tube.

Tests of [illegible]

[illegible]

Voice

[illegible] louder, is cleaner [illegible]. E is happier [illegible].

Violin

E shows up much louder on this cleaner & very natural in tone quality.

Voice

E shows up louder, cleaner & better here also.

Oiling

Ring EX	100	100
AX little further [illegible] hand	90	105
SX further than E Metallic	[illegible]	95

Loose

EX	100	100
AX	90	105
SX	95	110

Test of [illegible] [illegible]
AB [illegible] [illegible] [illegible]

AS [illegible] back	100	100
as loosened	[illegible]	90

Tight

as [illegible]	100	100
as loosened	102	105

[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible]
[illegible] [illegible]

		Violin		
1	S		100	100
2	E		90	90
		Voice		
1	S		100	100
2	E		95	110

1/20/17.

Had reason D made up so that the hole moved for 1/2" nozzle and trunnion which we have.

On test with violin and with Dawsons voice

	Violin		
S		100	100
EX		90	90
	Voice		
S		100	100
EX		95	110

A number of records made previously and today were taken down to the music room to compare on machine there.

These showed as follows

S, small hole	100	100
S, large hole	120	100
S, 1/2" hole	110	105

Comparing D. & E on voice & violin showed S apparently the better on violin, but E the better & louder on voice.

(01)

1/31/17.

Dawson made up two new recorders. Both installed on test.

Tested #1 Recorder, made of softened .0005" aluminum, as follows:

100		100	100
1X	(blades)	80	105
1X tightened	surface-ing	82	110

This recorder however is way back in the horn & weak & dead. The quality is good but volume is weak and sounds far back.

On tightening up, became firmer and a little louder, but developed a slight whistle or squeal which shows as surface.

There is one curious feature to these ring recorders that I do not understand. #100 a head recorder is louder than any of them. Is it possible

that, as some of the first results seemed to show - that the head recorders are louder than the ring recorders - or is it that the straight head, even on a trunnion not designed for it, producing an expansion chamber, is louder than the more carefully carried out ring recorders?

Check this by testing out the regular recorders with
1. Straight trunnion and nozzle.
2. Tapered trunnion and nozzle.
3. Against similar ring recorders.

Test of Recorder #100 with tapered trunnion against straight trunnion

100 tapered trunnion	100	100
100 straight trunnion	110	80

In this the tapered trunnion was not quite as loud as the straight trunnion but was firm & true.

and hoedo. The straight trunnion was louder but blasted on powerful notes - was not so good in quality and went to pieces.

Comparison Head 4 on straight trunnion, tapered trunnion & same recorders on head X.

1	R3 -	Head	4 - St trunnion	100	100
3	"	"	4 - Tapered trunnion	90	110
2	R3	"	X - " "	95	115
3	RD	"	4 - St trunnion	100	100
1	RD	"	4 - Tapered trunnion	105	110
2	R3	"	X - " "	100	105
3	RE	"	4 - Straight Trunnion	100	100
1	RE	"	4 - Tapered Trunnion	102	115
2	RE	"	X - " "	100	110

Recorders 3 & D have changed. On former tests 3 was sharp & fairly loud, now it is full & louder than D and in every way

better.

It is evident ~~that the~~ tempered aluminum is ~~not right~~ – is good quality but ~~not~~ enough spring and come back ~~to~~ make the board live or lively.

2/1/17.

Comparison and recorder

100		100	100
① AX	Surface	10	100
8X	Blubs. Too sensative	110	90
② AX	too sensative, Fine surface	100	100
100	Blubs -	100	100

① A. showed too much surface - found needle to have been broken off.
② Replaced needle & found too sensative

100	100	100
3X	90	120
107	85	120
2X	75	125

C913

[ITEM(S) FOUND IN BOOK]

(1) Soprano, tenor and baritone scales showing correct and incorrect scales & notes.

(2) Compare correct & incorrect opera selections.

(3) A cylinder record showing very faulty interpretation.

(4) Compare Anna Case & faulty sustained notes also pure sustained note & tremolo on sustained note.

(5) Records showing sudden change in timbre. Indicate by light or have music snap.

(6) Compare sharp & full & mellow voice on same piece. "Home" blackboard showing drop in overtones.

(7) Chart showing scales of some of our singers, photo micrographs of these showing overtones.

(8) Records of true notes with tremolo or one or two tremolo notes.

(9) Chorus singing in pitch & out. Use ours with & without tremolo

(10) Show by chart what a beat comes from - 1, 2, 3 & more

(11) (?)

[ITEM(S) FOUND IN BOOK]

(13) Have Werner duplicate a well known song backwards.

(14) Rig up chronograph to record personal equation

(15) Model of larynx - vocal chords show they work - also mechanical illustration show skeleton of artificial larynx

(16) Rig up diaphragm with mirror to with mirror to show volume of sound.

(17) Show model diaphragm, diamond shaft board on edge of which is mounted.

(18) ?

(19) Show mechanical timbre in victor True overtones in piano.

(20) Show very poor & very good scale

(21) Illustrate uncertain singers - one who on some notes flats - another who is even throughout.

(22) Record with perfect contralto, mezzo soprano, soprano, coloratura, basso, bassobaritone, baritone, high baritone, tenor people to sing to practice by.

(23) Record in German, same man in Italian, same in all vowels.

[ITEM(S) FOUND IN BOOK]

3

(24) Illustrate Punch & Judy character to soprano by over speed & contralto by underspeed.

(25) Have two phonographs one regulating correctly other not - to illustrate.

(26) Have cylinder recording machine to take scales from audience. Preserve good ones & send to Orange. Have Piano.

(27) Chart illustrating usance of trombone, cornet, clarionet and instruments. Show fundamental without overtones & then both superposed.

[ITEM(S) FOUND IN BOOK]

Get after Hayes.

[ITEM(S) FOUND IN BOOK]

Remember

1 - Several Soprano Scales from Foreign Tosi, also Tenor & Baritones - if Werner can duplicate

2 - Rejected Opera pieces for illustration, also ours & Regular.

3 - The Cylinder record for Zero. Interpretation

4 - Anna Case sustained, also Newark woman in Ave' Maria on sustained & compare with bad sustained, tremolo.

5 - Records showing sudden change of timbre. Have the music & mark the part so audience knows when it comes.

6 - Records showing a sharp Voice & same tune, if possible a mellow Voice. Have blackboard showing drop of overtones.

7 - Chart showing scale, notes as record looks under Microscope with overtones, many of our singers.

8 - Records showing no tremolo on most all notes & then one or two notes with tremolo.

9 - Chorus singing where they sing to pitch & where they do not. Use our & Victor's with & without tremolo.

10 - Show by chart what a beat comes from - 1 beat 2, 3, & more.

11 - Have one of our singers start every note full strength & cut off sharp - then another rising for interpretation.

12 - Sing a well known song in even monotonous volume, then another proper inflection, then another dramatically.

13 - Werner ~~did~~ recite a well known song backwards.

14 - Rig up a chronograph to record personal equation.

15 - Model of the larynx - Vocal chords, & how they work - also a mechanical illustration, Show Helmhols artificial larnyx.

16 - Rig up the diapm. with mirrow to show volume of sound.

17 - Show Model diaphm, Diamond & 6 ft. board on edge of which is waves.

18 - Record sung in harmony 3rds sung solo, sung Regular way.

19 - With Victor, illustrate mechanical timbre & same tune with ours, show effect of supressing mechanical false waves & adding overtones.

20 - Show a very poor scale & a very good scale.

21 - Illustrate an Opera song where volume of sound is uneven, & some notes so powerful as to throw recording mechanism out of gear, while another Opera singer gives even volume.

22 - Records with scales perfect, for Contralto, Mezosophrano - Sophrano & Caloratura, Ditto Basso, Basbaritone, Baritone & High Baritone, Tenor - To sing to & practice by.

[ITEM(S) FOUND IN BOOK]

23 - Record in German, same man in Italian, same in all vowels.

24 - Illustrate Punch & Judy Character given by speed & Contralto like by less than speed.

K 25 - Give song with two phones. reproducing simultaneously one only adjusted.

K 26 - Have Cylinder recording machine & take scales from audience, Save those which are good & send with name to Orange - Have Piano at lecture.

27 - Illustrate Chart of waves of Trombone, Cornet, Clarionette & all the instruments, Show fundamental waves without overtones, & then side by side, the same waves with the overtones.

Apparatus

1 - Bell's Diamond Phonograph

1 - Edison P.K. [illegible]

1 - Cylinder Recording Machine - Wax cylinder

Recording on the line with attachment).

(28) Deluion Experiment. Violent [illegible] leave and plays. Stroboscope continue. Same with voice.

[ITEM(S) FOUND IN BOOK]

Mirror -12-
Mirror Lady Mirror -12-
Mirror -12-